CLAIMS

1. A balloon dilatation catheter for medically treating a patient, comprising:

a high-strength proximal tube having proximal and distal ends, and defining a proximal portion of an inflation lumen;

a distal shaft assembly defining a distal portion of the inflation lumen in fluid communication with the proximal portion of the inflation lumen of the proximal tube, such that the proximal and distal portion of the inflation lumen together define an inflation lumen extending from an inflation port near a proximal end of the catheter to a distal inflation port where the inflation lumen opens into the balloon,

the distal shaft assembly further defining a guidewire lumen extending from a distal guidewire port near a distal end of the catheter to a proximal guidewire port near a transition between the proximal tube and the distal shaft assembly, the distal shaft assembly having a flexibility greater than the proximal tube;

a balloon affixed to the distal shaft assembly near its distal end; and

a stiffening wire positioned across the transition, providing flexible bending strain relief;

the stiffening wire having a portion near its distal end affixed to the distal shaft assembly in a stiffening wire seal area, and the stiffening wire having a proximal end extending into and floating within a distal portion of the proximal lumen defined by the proximal tube.

2. The dilatation catheter in accordance with claim 1, wherein the distal shaft assembly includes a tube defining the first distal lumen and the guidewire lumen, in a dual-lumen arrangement.

3. The dilatation catheter in accordance with claim 1, wherein the distal shaft assembly includes an inner and outer tubular body, in a coaxial arrangement.

4. The dilatation catheter in accordance with claim 3, wherein the stiffening wire is affixed to the inner tubular body near the proximal end of the inner body.

5. The dilatation catheter in accordance with claim 3, wherein the inner tubular body defines the guidewire lumen, and the portion of the inflation lumen defined by the distal shaft assembly is defined between the inner and outer tubular bodies.

6. The dilatation catheter in accordance with claim 1, wherein the proximal tube is metal, and the distal shaft assembly includes polymer components.

7. The dilatation catheter in accordance with claim 1, further comprising a stent crimped around the balloon in an initial configuration.

8. A stent delivery system for medically treating a patient, comprising:

a high-strength proximal tube having proximal and distal ends, and defining a proximal portion of an inflation lumen;

a distal shaft assembly defining a distal portion of the inflation lumen in fluid communication with the proximal portion of the inflation lumen of the proximal tube, such that the proximal and distal portion of the inflation lumen together define an inflation lumen extending from an inflation port near a proximal end of the catheter to a distal inflation port where the inflation lumen opens into the balloon;

the distal shaft assembly further defining a guidewire lumen extending from a distal guidewire port near a distal end of the catheter to a proximal guidewire port near a transition between the proximal tube and the distal shaft assembly, the distal shaft assembly having a flexibility greater than the proximal tube;

a balloon affixed to the distal shaft assembly near its distal end; and

a stiffening wire positioned across the transition, providing flexible bending strain relief;

the stiffening wire having a portion near its distal end affixed to the distal shaft assembly in a stiffening wire seal area, and the stiffening wire having a proximal end extending into and floating within a distal portion of the proximal lumen defined by the proximal tube; and

a stent crimped around the balloon in an initial configuration.

9. A balloon dilatation catheter for medically treating a patient, comprising:

a high-strength proximal tube having proximal and distal ends, and defining a proximal portion of an inflation lumen;

a distal shaft assembly including an inner and an outer tubular body, a distal portion of the inflation lumen being defined by an annular space between the inner and outer tubular bodies, such that the distal portion of the inflation lumen is in fluid communication with the proximal portion of the inflation lumen defined by the proximal tube;

the proximal and distal portions of the inflation lumen together defining an inflation lumen extending from an inflation port near a proximal end of the catheter to a distal inflation port where the inflation lumen opens into the balloon;

the inner tubular body defining a guidewire lumen extending from a distal guidewire port near a distal end of the catheter to a proximal guidewire port near a transition between the proximal tube and the distal shaft assembly, the distal shaft assembly having a flexibility greater than the proximal tube;

a balloon affixed to the distal shaft assembly near its distal end; and

a stiffening wire positioned across the transition, providing flexible bending strain relief;

the stiffening wire having a portion near its distal end affixed to the inner tubular body in a stiffening wire seal area, and the stiffening wire having a proximal end extending into and floating within a distal portion of the proximal lumen defined by the proximal tube.